

UNITED STATES MARINE CORPS  
Logistics Operations School  
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MTCC 4406

**STUDENT OUTLINE**

**NIGHT DRIVING OPERATIONS**

**LEARNING OBJECTIVES:**

1. Terminal Learning Objective: Provided with a requirement to direct limited vision driving, required equipment and materials, and the references, identify how limited vision driving operations should be performed, per the references. (35XX.03.07)
2. Enabling Learning Objectives: (1) Provided with a requirement to direct limited vision driving, required equipment and materials, and the references, identify the methods of illuminating routes for night driving operations, per the references. (35XX.03.07a)
  - (2) Provided with a requirement to direct limited vision driving, required equipment and materials, and the references, identify how to communicate at night using flashlights, per the references. (35XX.03.07b)
  - (3) Provided with a requirement to direct limited vision driving, required equipment and materials, and the references, identify the appropriate following distances during night driving operations, per the references. (35XX.03.07c)
  - (4) Provided with a requirement to direct limited vision driving, required equipment and materials, and the references, operate equipment at night utilizing night vision goggles (NVGS), per the references. (35XX.03.07d)
  - (5) Provided with a requirement to direct limited vision driving, required equipment and materials, and the references, operate the equipment using equipment blackout drive lights, per the references. (35XX.03.07e)

**OUTLINE**

**1. PURPOSE AND TECHNIQUES OF NIGHT DRIVING**

a. PURPOSE OF NIGHT DRIVING OPERATIONS

(1) Night movements may be required for tactical reasons, the need to achieve higher cargo haul rates, or in response to some unexpected development that may be tactical or administrative in nature.

(2) Random night movements can also be effective in keeping the enemy "in the dark" as to the unit's intentions.

(3) Enemy air, armor, and long-range fire capabilities, and the requirements for secrecy and surprise may frequently dictate movement a night.

b. Blackout Driving Techniques

(1) To reduce the risks that may be encountered during night or blackout driving, it is suggested that the windshield, if applicable to the vehicle that is being operated, be lowered to increase the driver's visibility.

(2) The vehicle must be driven at a reduced speed.

(3) Whenever possible, an individual should be posted in the rear of the vehicle (applicable for M998, M923, et cetera) to provide the required signals, through the use of flashlights, to the drivers of the following vehicles.

(4) Use roads that the drivers are familiar with, if possible.

c. Advantages and Disadvantages of Blackout Driving

(1) The advantages of blackout driving are:

(a) Limited observation by the enemy.

(b) Darkness provides better security.

(2) The disadvantages of blackout driving are:

(a) The convoys or vehicles are more vulnerable to ambush and close range snipers.

(b) Driver fatigue is increased and vision is reduced.

(c) The speed at which the vehicle can normally travel is greatly reduced.

## **2. NIGHT MOVEMENTS UNDER BLACKOUT CONDITIONS**

a. GENERAL. Night convoys may be more vulnerable to harassing fire and ambushes in a hostile environment; however, random night moves can be effective in keeping the enemy off balance. Since control and reconnaissance capabilities are reduced during periods of reduced visibility, night convoys should be kept small in size, and only designated one-way roads with which drivers are familiar should be used. Oversized or unusually slow vehicles should not be included due to difficulties in movement and slowness in recovery.

b. PLANNING AND PREPARATION. Night moves require a higher degree of coordination than do daylight moves. More emphasis is needed on the following: coordination of fire support; use of visual signaling devices; liaison; procurement of night mine and booby trap detection devices; passing through control points; and use of escorts, security, and reaction forces. Night immediate-action drills should be rehearsed and all convoy members should receive refresher training in night security and night defensive techniques.

c. LIGHTING AND SECURITY. A decision must be made as to whether the convoy will move with the headlights on or under blackout conditions. If operating forward of the light line, blackout lights are required. Under blackout conditions, vehicle distance will close to approximately 60 to 180 feet and speed will seldom exceed 5 to 10 miles per hour. Due to the slow speed and close interval of the vehicles, they are extremely vulnerable to ambush and interdiction fire. If the situation permits operating with the headlights on, the vehicle interval can be extended and the speed increased.

d. SIZE AND SECURITY. Another decision must be made as to escort and security requirements. Increasing the size of security forces creates a greater noise and control problem. Decreasing security forces permits better control and noise discipline. Regardless of the choice, most vehicles, including escorts, will be road bound if brought under attack. The best reaction, as in daytime operations, is for vehicles to rapidly clear, or not enter, the kill zone.

## **3. ILLUMINATING ROUTES FOR NIGHT DRIVING OPERATIONS**

a. BALISAGE. Motor transport units operating in NATO countries may become involved in blackout operations in which the balisage system of lighting for military roads is used. This system involves the use of luminous markers (battery lights or kerosene flame lights mounted on stakes or placed on the ground at given intervals). These beacons, known as balises, provide a row of lights to mark the road for the vehicle operator and

permit near daytime speeds. These lights are designed to be readily visible to a driver from his position in a vehicle cab, but not readily detectable from the air. Balises come in several different colors to include: red, orange, yellow, green, and blue. Their color and positioning provide guidance and warning to vehicle operators using the road.

#### **4. NIGHT VISION GOGGLES (NVG'S)**

a. Night vision goggles are a self-contained, night viewing system worn on the head. The goggles provide the wearer with improved night vision capabilities using available light from the night sky (starlight, moonlight).

b. The goggles can be worn with or without the standard battle helmet and provide the capabilities for reading, performing manual tasks, patrolling, medical aid, construction work, mobile equipment operation, vehicle driving, air support, and surveillance.

#### **5. PURPOSE AND LOCATION OF VEHICLE BLACKOUT LIGHTS**

##### **a. PURPOSE OF VEHICLE BLACKOUT DRIVING LIGHTS**

(1) Blackout driving lights provide the driver a minimum of light while at the same time keeping the light from being noticed by passing aircraft or enemy on the ground.

(2) Passengers riding in the bed of the vehicle should be able to locate the vehicle to the rear if the vehicle blackout driving lamp is in use.

b. LOCATION OF THE BLACKOUT DRIVING LAMP. The blackout driving lamp is located directly behind the directional light to the left of the vehicle grille, except for the LVS, where it is located in the center of the grille.

##### **c. PURPOSE OF BLACKOUT MARKERS**

(1) The blackout markers provide a means for locating a vehicle during blackout conditions.

(2) The markers do not illuminate the road and only indicate the position of a vehicle. Blackout markers are effective up to 250 yards depending upon the weather.

(3) The marker lights cannot be seen from an airplane if it is flying higher than 400 feet.

(4) The blackout markers are used to judge the distance from your vehicle to the vehicle in front.

d. LOCATION OF BLACKOUT MARKERS

(1) The front and rear blackout marker lights are located in the vehicle's turn signal units.

(2) The rear blackout brake lights are located in each light assembly and contain a white lens.

e. BLACKOUT MARKER LIGHT COMBINATIONS

(1) The light combinations for the front blackout markers are as follows:

(a) Each front light has one pair of "cat's eyes" that shows white when they are on.

(b) When the following distance is 60 to 180 feet, each pair of "cat's eyes" appears as one light, indicating that the vehicle behind you is at the proper following distance.

(c) When the following distance is 60 feet or less, you can see one pair of "cat's eyes" in each light. This warns the operator that the vehicle behind him is too close.

(2) The light combinations for the rear blackout markers are as follows:

(a) Each rear lamp unit has two pairs of "cat's eyes" which show red when they are on.

(b) Each pair appears as one red light when the vehicle operator is 180 to 60 feet away from the vehicle he is following, and as two pairs of "cat's eyes" in each light if the following distance is less than 60 feet.

(c) One point of light informs the driver that he is too far behind the vehicle he is following; two lights assures the operator that he is following at the proper distance; and four lights warn the operator that he is getting too close to the vehicle he is following.

(3) The blackout brake light is located at the lower portion of the composite light but; it may be a separate unit mounted on the right of the taillight unit. The blackout brake light flashes a white light when the brakes are applied.

**6. COMMUNICATING AT NIGHT USING FLASHLIGHT SIGNALS** Flashlight signals using "red lenses" will include the following:

a. To signal "Come Ahead," raise both flashlights up in front of your face with the tips pointed straight up. Move the flashlights toward your face and back again. The flashlights will be ON only when moving them toward your face.

b. To signal "Move in Reverse," raise both flashlights over your head then bring them in an arc downward in front of you to chest level. The lights will be ON only in the downward motion.

c. To signal "Slow Down," raise both flashlights to chest level parallel to the ground. Turn ON the flashlights and move them in an up and down motion in front of your chest.

d. To signal "Turn Right," position the flashlight in your left hand at head level at your left side. With the flashlight ON, move the light back and forth from your head sideward to your left.

e. To signal "Turn Left," position the flashlight in your right hand at head level at your right side. With the flashlight ON, move the light back and forth from your head sideward to your right.

f. To signal "Stop or Halt," place a flashlight in your right hand at eye level, and extend your right arm straight out in front of your face with the light pointed straight up. The flashlight should be blinking on and off.

g. The signal for "Turn Off Engine," is to hold a lighted flashlight in your right hand in front of your throat and perform a slashing motion across your throat.

h. To signal "Increase Speed," hold a lighted flashlight in the right hand at the right side at a position vertical to your head. Repeatedly, move the flashlight rapidly up past your head by fully extending your arm and bringing it back down again.

i. To signal "Start Engines," hold a lighted flashlight in your right hand with your right arm fully extended. Direct your right arm forward and move the flashlight counterclockwise in a circular motion, simulating the cranking of an engine.

j. To signal "Assemble," hold a lighted flashlight in your right hand with your right arm fully extended over your head, and rotate the flashlight counterclockwise in a circular motion above your head.

k. To signal "As You Were," hold lighted flashlights above your head with both arms fully extended and crossed. Uncross and cross your arms several times or until your signal is acknowledged.

l. To signal "Dismount," hold a flashlight in your right hand with your right arm fully extended at your right side. Keeping your arm extended at your right side, raise your right arm up until it is almost vertical with your head. Now turn the flashlight ON and lower your arm back down to your side. Turn the flashlight OFF. Repeat this procedure several times or until your signal is acknowledged by all.

m. To signal "Mount," hold one lighted flashlight in the left hand with the left arm bent forward at the waist and an unlit flashlight in the right hand with the arm fully extended at the right side and partially away from the body. With the flashlight lit, move the right arm in an arc away from the side up towards the head. Turn OFF the flashlight. Repeat this motion with the right arm, shutting the flashlight OFF at the end of each upward stroke.

n. To signal "Attention," hold a flashlight in your right hand with the right arm fully extended to the right side at a 45 degree angle from your head. With the flashlight lit, move the flashlight repeatedly over your head and back to the start position.

o. To signal "Ready," hold lighted flashlights in both hands with your arms fully extended horizontally in front of the chest.

p. To signal "Extend or Open Up," hold lighted flashlights in both hands with your arms extended over your head. Lower both arms to a horizontal position along your sides in line with your shoulders. Turn the flashlights OFF. Repeat this procedure until your signal is acknowledged by all.

q. To signal "Close Up," hold lighted flashlights in both hands with your arms extended and in a horizontal position out at your sides in line with your shoulders. Raise your arms up to your head until they are in the vertical position. Turn the flashlights OFF. Repeat this procedure until your signal is acknowledge by all.

r. To signal "Close Up and Stop," make a half right turn, hold lighted flashlights in both hands with your arms fully extended above your head. Move both arms down in front of your body until they are horizontal and pause momentarily; continue the downward movement until your arms are at your sides. Turn

the flashlights OFF. Repeat this procedure until your signal is acknowledged by all.

s. To signal "By the Flank," hold lighted flashlights in both hands in the desired direction with your arms fully extended and horizontal to the deck.

## **7. PURPOSE, CAPABILITIES, AND DESCRIPTION OF NIGHT VISION GOGGLES (NVG'S)**

a. The purpose of NVG's is to provide the wearers with a means of performing certain mission tasks during darkened conditions. NVG's provide night vision capabilities using the available light from the night sky such as, starlight and moonlight.

### **b. NVG FEATURES.**

(1) NVG's have a built-in infrared light source that provides added illumination for close-up work.

(2) An adjustable cushioned headmount assembly permits the NVG's to be worn with or without the battle helmet or protective mask.

(3) To prevent the lens from fogging, demisting shields are provided with the NVG's to be installed over the eyepiece lens before operation in rainy, humid, and arctic conditions.

(4) The NVG's can be worn in arctic, desert, rainy, and humid conditions and in NBC environments.

### **c. INABILITIES OF THE NVG'S.**

(1) Even though the NVG's can be worn in almost any environmental condition, the effectiveness of NVG's is greatly reduced in rain, haze, fog, snow, or smoke.

(2) NVG's are less effective when viewing into shadows and other darkened areas.

(3) NVG's require some night light such as, starlight, moonlight, and so forth, to operate.

(4) Operation of NVG's with a low light level will produce a noisy or grainy picture.

(5) Because of the construction of the headmount assembly and goggles, the AN/PVS-7B cannot be worn with eyeglasses.

d. DESCRIPTION OF NVG'S AN/PVS-7B

(1) NVG's are a self-contained, night vision viewing system worn on the head with or without the battle or aviator helmet or can be hand held.

(2) The AN/PVS-7B consist of two main subassemblies: the goggles and the headmount assembly.

(a) The goggle assembly is a binocular viewing unit normally mounted to a cushioned headmount with adjustable head straps for hands free support and stability during operation.

(b) A quick release latch is provided to detach the goggle from the headmount assembly, clearing the operator's field of view in case of emergency.

(c) The goggles may be used as a handheld device when not attached to the headmount assembly.

(d) The goggles are mounted in a cushioned headmount assembly which is strapped to the user's head, and may be worn with or without the helmet.

(3) The accessories for the NVG include: a headmount assembly, two demist shields, three browpads of different thickness, an operator's manual, lens paper, carrying case, a light interference filter, a sacrificial window, and a shipping-and-storage case.

(4) The AN/PVS-7B has an automatic high light level cutoff feature that is designed to protect the image-intensifier tube from exposure to long periods of high levels of light. When the goggles are exposed to daylight or roomlight conditions for approximately one minute, the cutoff will activate and shut off power to the image-intensifier tubes. The automatic cutoff device is not normally affected by brief exposure to high-light levels such as headlights, flares, and muzzle flashes unless focused directly on the high-light detector located on the front of the goggles.

e. DESCRIPTION AND USE OF THE AN/PVS-7B OPERATOR CONTROLS.

(1) OFF-ON-PULL/IR Switch. The OFF-ON-PULL/IR Switch turns the goggles and IR illuminator on and off. To use the goggles, pull and turn the switch to the ON position and when they are not being used pull the switch and turn to the OFF position.

(a) When a red light appears in the left eyepiece, this indicates that the goggles are in the IR position. The goggles are placed in this position during periods of extreme darkness and for viewing at close distances up to three meters.

(b) When a flashing red indicator light appears in the right eyepiece, this is a signal to the operator that a low battery condition is present.

(2) Objective lens focus. The objective lens focus ring is used to adjust the focus of the objective lens for the sharpest view. The lens is focused by rotating the focus ring which moves the objective lens. Rotation of the focus ring causes the objective lens to move about one-quarter of an inch for adjustment of the viewed image. This provides a focus range from 9.8 inches to infinity.

(3) Latch. The latch is used for the separation of the goggle assembly from the headmount assembly.

(a) Provision is made in the goggle design to quickly disconnect the goggle assembly from the headmount assembly by pressing the latch

(b) If the goggles are operating, the goggles will shut off automatically when disconnected from the headmount assembly.

(4) The NVG is powered by either two AA batteries or one lithium battery. The batteries are located in the battery compartment on the right side of the goggles.

(5) Diopter focus rings. Each eyepiece is adjustable by rotating the diopter focus ring which moves the eyepiece assembly nearer or further from the screen of the image tube.

(a) This adjustment permits the operator to compensate for his particular eyesight without glasses.

(b) No further adjustment should be needed once a sharp focus on the image tube is achieved.

(6) Eyepiece (interpupillary distance). The two eyepiece assemblies are mounted in the rear body of the goggles. They may be manually moved laterally to adjust for the distance between the eye by sliding the eyepieces either together or apart so that each eye can observe the entire field of view at the same time. The eyepieces are secured in place by internal friction of the mating surfaces.

(7) Socket assembly release button. The eye relief adjustment allows the goggle assembly to be moved in respect to the headmount assembly to achieve the proper fit of the eye cups to the face of the operator. The eyecups must seal around the eyes to prevent the green glow from escaping.

(a) Pressing the relief button on the socket assembly frees the goggles to slide on a rod which allows the spacing between the goggle assembly and the operator's eyes to change.

(b) The goggle assembly is locked in place by removing the pressure on the release button.

## **8. OPERATING THE NVG'S**

### **a. Preparation of the NVG for Operation**

(1) First, remove the NVG from its carrying case.

(a) Make sure the objective lens cap remains on when the goggles are not in use.

(b) To prevent damage to the intensifier tube, do not expose the unprotected objective lens to bright light with power applied to the goggles.

(2) The next step is to install the batteries, so make sure the rotary switch is in the OFF position.

(a) Now remove the battery cap and insert the lithium battery in its compartment. The lithium battery is installed in its compartment with the recessed (+) side in first.

(b) The alkaline batteries are installed in the compartment with the (+) end in first. Make sure the batteries being used are of the same type.

(3) After the batteries are correctly installed inside of the compartment, replace the battery cap and tighten the cap firmly to ensure a watertight seal.

b. Wearing of the NVG's. The first few steps in the sequence for preparing the NVG's for wearing are the same as the steps for the preparation of the NVG's for use, so we'll start off with the NVG's already in place on your face.

(1) Preparing the NVG's for viewing.

(a) First, set the OFF-ON-PULL/IR switch to the ON position and observe that a green glow is visible in each

eyepiece after a short delay. If a green glow does not appear in one or both of the eyepieces, the NVG's are malfunctioning and should not be used.

(b) Next, pull the OFF-ON-PULL/IR switch out and rotate the switch clockwise to the IR position. With the goggles held to the eye, observe that a red light appears in the left eyepiece. This indicates that the IR source is operating.

(c) If you are in a darkroom or at night, observe that the red light appears in the left eyepiece and the IR illuminator can be observed up to a distance of three meters.

(d) Now turn the OFF-ON-PULL/IR switch clockwise to the OFF position, and observe that the red indicator and green glow disappear.

(2) Headmount assembly installation and operation.

(a) Prior to installing the headmount, remove the goggles if they are attached and unstrap the chin straps if they are snapped in place.

(b) The first step in the installation of the headmount is to loosen the four chin straps so the ends of each strap are approximately two inches from the sliding star buckle.

(c) Next, with both hands, grasp the neck pad assembly and pull it over your head and down the back of your neck.

(d) If the headmount is too loose or too tight, remove the attached browpad and replace it with either a thicker or thinner browpad.

(e) Now snap the front and rear snaps in place with the left hand and, holding the chin cup in position on the chin, adjust the rear chin cup assembly straps until a little pressure is felt on the chin. Do not over tighten the chin straps.

(f) Next, maintain chin cup position and remove the slack from the front and rear chin straps. Do not over tighten the straps.

(g) With the chin straps tightened, make sure that the cross-strap assembly is not twisted and remove the slack by adjusting the vertical adjustment strap at the neck pad.

(h) Finally, adjust the chin straps and vertical adjustment until the chin cup and headband assembly are in a comfortable but firm position.

(3) Installation and operation of the goggles.

(a) First align the goggle latch with the headmount socket assembly. Press and hold the latch lever while installing the goggles into the headmount socket assembly and release the latch when the goggles are fully engaged in the socket.

(b) Next, depress the socket-release button and move the goggles back toward your eyes until the eyecups and eyepieces are completely aligned. The eyecups must completely seal around the eyes and prevent the green glow from escaping when the goggles are turned on.

(c) Now, energize the goggles by positioning the ON-OFF-PULL/IR switch to the ON position and observe that a green glow gradually appears in each eyepiece.

(d) With the goggles energized, adjust the interpupillary distance by sliding the eyepieces together or apart so each eye can observe the entire field of view at the same time.

(e) The diopter adjustment rings are used to focus your eyes (without glasses) on the image intensifier screen.

1 First, cover the left eye and adjust the right diopter ring for the clearest focus on the image intensifier screen.

2 Next, cover the right eye and adjust the left diopter ring for clearest focus on the image intensifier screen.

3 Now adjust the eye relief distance by pressing the socket-release button and sliding the goggles fore or aft for full field of view of the image intensifier screen.

4 Finally, re-adjust the diopter rings for the best image.

(f) After the diopter rings are adjusted, adjust the objective lens focus while observing an object until the sharpest image is obtained.

(g) The sharpest image can only be observed when the objective lens and both eyepieces are properly focused.

(h) Finally, re-adjust the vertical head strap assembly for vertical adjustment of the headmount until the goggles are aligned with the eyes.

(4) Using the NVG IR illuminator. The IR illuminator is a trouble light for conditions of extreme darkness and as was previously mentioned, caution should be used when using the IR illuminator because it can be detected by the enemy using NVG's.

(a) To turn the IR illuminator on, pull out on the OFF-ON-PULL/IR switch and turn the switch clockwise to the IR position and observe that a red indicator light appears in the left eyepiece and the area, approximately three meters, on your immediate front is lighted.

(b) As the IR illuminator is turned on, the momentary flash that you see is normal.

c. Operation of the NVG's in Unusual Conditions. As was previously mentioned, the effectiveness of the NVG's is greatly reduced in rain, haze, fog, snow, or smoke. As visibility decreases, you will notice a gradual reduction in light and visual sharpness. If driving can be conducted safely with the goggles, continue on with your mission; if not, adjust your driving speed, remove the goggles, and turn on your headlights or switch to blackout drive lights, and use the NVG's only when the situation permits and it is safe to do so.

(1) Dusty and sandy areas. The operation of the NVG's in dusty and sandy areas is the same as operating the NVG's under normal conditions except for the following:

(a) Blowing dust and sand can cause pitting and scratching of the optical elements and damage to mechanical components, so prior to operating the goggles install the sacrificial window over the objective lens.

(b) Also, always avoid pointing the goggles into the wind unless it is necessary to complete the operation.

(c) Always keep the carrying case closed unless removing or replacing items, this will prevent debris from entering the case.

(d) Make sure all dust and sand is removed from the goggles prior to placing the goggles back in the case.

(2) Operation of NVG's in salt water areas. The operation of NVG's in salt water areas is the same as the operation of the goggles under normal conditions. An exception is that the operation of the goggles in this type of environment could cause corrosion.

(a) After the exposure of the goggles to salty air, wipe off the outer surfaces of the goggles and headmount assembly with a clean cloth dampened with fresh water.

(b) Dry the dampened surfaces completely with a clean-dry cloth. The objective and eyepiece lens should only be cleaned with lens paper.

(3) Operation of the NVG's in rainy or humid conditions. The operation of the NVG's in rainy or humid conditions is the same as the operation of goggles under normal conditions with the exception of the following:

(a) First, install the demisting shields prior to use.

(b) Next, make sure that the carrying and storage cases remain closed unless removing and replacing items.

(c) Because rainy or humid conditions could cause parts to corrode or deteriorate, make sure all parts are dried with a clean-dry cloth after exposure to rain or high humidity before storing the goggles in the carrying case.

(d) Finally, use lens paper to clean the objective and eyepiece lens after they are dry. Do not wipe the demisting shields while they are wet or with wet lens paper. This may cause the shields to become damaged.

(4) Operation of the NVG's in snow covered ground conditions. Extreme caution should be exercised when driving over snow covered grounds during periods of starlight ambient light conditions because visibility may be degraded.

## **9. OPERATOR MAINTENANCE AND TROUBLESHOOTING**

a. Preventive Maintenance Checks and Services (PMCS). To keep the NVG's in good operating condition, operator PMCS is required before, during and after the operation of the goggles. The OFF-ON-PULL/IR switch must be in the OFF position during the inspection.

(1) Optical lenses

(a) All lenses should be inspected for dirt, finger print residue, chips, or cracks. If necessary, clean and dry lenses with water and lens tissue.

(b) If the lenses are cracked or chipped, send the goggles to a higher level of maintenance for repair.

(2) Exterior surfaces

(a) Inspect the housing of the goggles for damage.

(b) If the goggle housing is damaged, send the goggles to a higher level of maintenance for repair.

(3) Battery compartment

(a) The battery compartment should be inspected for corrosion, defective battery cap spring contact, and performed packing in cap.

(b) If the battery compartment is corroded or defective, evacuate the goggles to the next higher echelon of maintenance.

(4) Headmount assembly eye relief

(a) Press the socket release button and check the socket assembly for free movement fore and aft. Also inspect the socket assembly for dirt or damage.

(b) If the socket assembly is dirty, clean the assembly with a clean lint-free cloth damped with water. If the movement of the socket assembly is still restricted after cleaning, send the headmount assembly to the next higher echelon for repair.

(5) Diopter adjust rings

(a) Make sure that the eyepieces rotate freely by rotating the diopter adjustment rings.

(b) If the eyepieces do not rotate freely when the rings are rotated, evacuate the goggles to the next higher echelon of maintenance.

(6) Interpupillary adjustment

(a) Check each eyepiece for free movement (together and apart).

(b) If movement is restricted, evacuate the goggles to the next higher echelon of maintenance.

(7) Objective lens focus knob

(a) Rotate the objective lens focus knob to ensure free movement (range is approximately one third of a turn).

(b) Evacuate the goggles to the next higher echelon of maintenance if the knob does not move freely.

(8) Demist shields

(a) The demist shields should be inspected for dirt, dust, scratches, or damage. The shields should be cleaned when dry, and cleaned with dry lens tissue only.

(b) If the lenses are damaged, turn them in to the next higher maintenance echelon for replacement.

(9) Sacrificial window

(a) Inspect the sacrificial window for dirt, dust, scratches, or damage. If necessary, clean the sacrificial window with clean water and dry with lens tissue.

(b) If the sacrificial window is damaged, turn it in to the next higher echelon of maintenance for determination of disposition.

(10) OFF-ON-PULL/IR switch

(a) First, inspect the goggles for a missing or broken knob.

(b) Next remove the batteries and position the switch from OFF to ON to PULL/IR. Each position should have a definite stopping point.

(c) Evacuate the goggles to the next higher echelon of maintenance if the knob is missing or broken or if the switch has no definite stops.

(11) Eyecups

(a) First, inspect each eyecup for dirt, dust, cracks or tears. If necessary, clean and dry each cup using clean water and lens tissue.

(b) Next, inspect each eyecup for a bent, broken, or improper fitting eyecup ring.

(c) If any of the above conditions exists, evacuate the goggles to the next higher maintenance echelon for replacement of the eyecups and eyecup ring.

(12) Headmount

(a) The headmount strap assemblies and browpad should be inspected for holes, cracks, defective fasteners or contamination.

(b) Replace any damaged browpads. If the headmount strap assemblies are damaged the headmount must be sent to a higher level of maintenance for repair/replacement.

(13) Headmount socket and goggle latch

(a) The headmount socket and goggle latch should be cleaned with a clean, lint-free cloth dampened with water before operation. The latch on the goggles should be inserted into the headmount socket to verify secure installation of the goggles on the headmount.

(b) If the two assemblies cannot be secured together, the assemblies must be evacuated to the next higher maintenance echelon for determination of malfunction.

b. Troubleshooting a Malfunctioning NVG. Prior to performing any troubleshooting make sure that the PMCS have been performed. The following NVG malfunctions may occur:

(1) A green glow is not visible in each eyepiece when the OFF-ON-PULL/IR switch is turned to ON.

(a) First check for a missing or not fully charged battery.

(b) If the battery is missing or not charged, install a fully charged battery in the battery compartment.

(2) The object being viewed cannot be seen clearly.

(a) First, check to make sure the focus knobs can be easily moved.

(b) If the knobs can be turned easily, adjust the focus knobs and diopter adjust rings for a clear view.

(c) Clean dirty or fogging lenses with lens paper.

(3) Light is visible around the outside edges of the eyecups.

(a) Check the adjustment of the eye relief distance. Re-adjust the eye relief distance if it is not adjusted properly.

(b) Check the resiliency of the eyecups. If the eyecups will not retain their shape, have them replaced.

(4) IR indicator fails to activate.

(a) The goggles are defective and should be replaced.

(5) Diopter and interpupillary adjustments cannot be made.

(a) The diopter adjustment ring is bent or broken and the eyepiece is defective.

(b) Evacuate the goggles to the next higher echelon of maintenance for repairs.

c. Lubrication of the NVG's. There are no operator lubrication requirements for the NVG so do not attempt to lubricate hard to turn knobs, such as the OFF-ON-PULL/IR switch, diopter adjust ring, focus knobs, knobs, and so forth.

#### **REFERENCES**

1. **FM 4-9 MOTOR TRANSPORT**
2. **TM 11-5855-262-10-2 OPERATOR MANUAL NIGHT VISION GOGGLES AN/PVS-7B**
3. **FM-21-305 MANUAL FOR WHEELED VEHICLE DRIVER**
4. **TM 10 MANUAL FOR SPECIFIC VEHICLES.**